

Three new synonyms in *Mussaenda* (Rubiaceae) from China

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Abstract The taxonomic status of two species and one form of the genus *Mussaenda* (Rubiaceae) from China is clarified: *M. inflata* Hsue & H. Wu, *M. anomala* Li and *M. pubescens* Ait. f. forma *clematidiflora* Chun ex Hsue & H. Wu are reduced to synonyms of *M. hirsutula* Miq., *M. esquirolii* Lévl. and *M. pubescens* Ait. f. respectively.

Key words *Mussaenda*, *Mussaenda hirsutula*, *Mussaenda esquirolii*, *Mussaenda pubescens*, synonymy, Rubiaceae.

In the course of revising the genus *Mussaenda* L. (Rubiaceae) from China, based on the study of specimens, especially type specimens, we came to the doubt that the establishment of two species and one form might not be well supported. Our field observations in Hainan, Guangdong and Guangxi provinces have confirmed our previous suspicion. Therefore, we suggest that *M. inflata* Hsue & H. Wu (1986) should be reduced to synonymy of *M. hirsutula* Miq. (Hutchinson, 1916; Hemsley, 1888), *M. anomala* Li (1943) to synonymy of *M. esquirolii* Lévl. (Léveillé, 1915), and *M. pubescens* Ait. f. forma *clematidiflora* Chun ex Hsue & H. Wu (1986) to synonymy of *M. pubescens* Ait. f. (Rehder, 1935).

1. *Mussaenda hirsutula* Miq. in Journ. Bot. Néerland. 1: 109. 1861. Type: not designated.

M. inflata Hsue & H. Wu in Acta Phytotax. Sin. 24: 234, fig. 1: 6–10. 1986, syn. nov. Type: China. Guangdong (广东): Yangchun (阳春), 1935-11-05, C. Wang (黄志) 38650 (holotype, IBSC!).

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The name *M. inflata* was based on a single specimen (Fig. 1: A). Other than the type, no specimen has ever been collected. In the original description of *M. inflata*, the authors indicated that it differs from *M. hirsutula* Miq. (Fig. 1: B) in having elliptic and ovate-lanceolate leaves, turbinate calyx-tubes, lanceolate calyx-lobes and corolla-tube inflated from the contracted throat to the base. Otherwise, the two species are not essentially different from each other.

After examining more materials of *M. hirsutula*, we conclude that the shape of the leaf of *M. inflata* falls well within the range of variation of *M. hirsutula* (Table 1).

In observing the flowering individuals in the field, we found that the character of corolla-tube inflated from contracted throat to base very often occurs in *M. hirsutula* and *M. hainanensis* Merr. in Hainan Province. After dissecting fresh flowers of *M. hirsutula* (Fig. 1: C), we confirmed that the phenomenon of corolla-tube with swollen base had been caused by insect-damage because the anthers and style in the corolla all disappeared in the flowers. Instead, a larva, or the feces left by the larva, was found in the corolla tube. The infection of insects that caused the change in corolla shape was often accompanied by other changes: the petals and the calyx-lobes swollen and enlarged, and the calyx-tubes inflated, making the calyx-tubes turbinate in shape. We dissected flowers of the type of *M. inflata* (Fig. 1: D), and

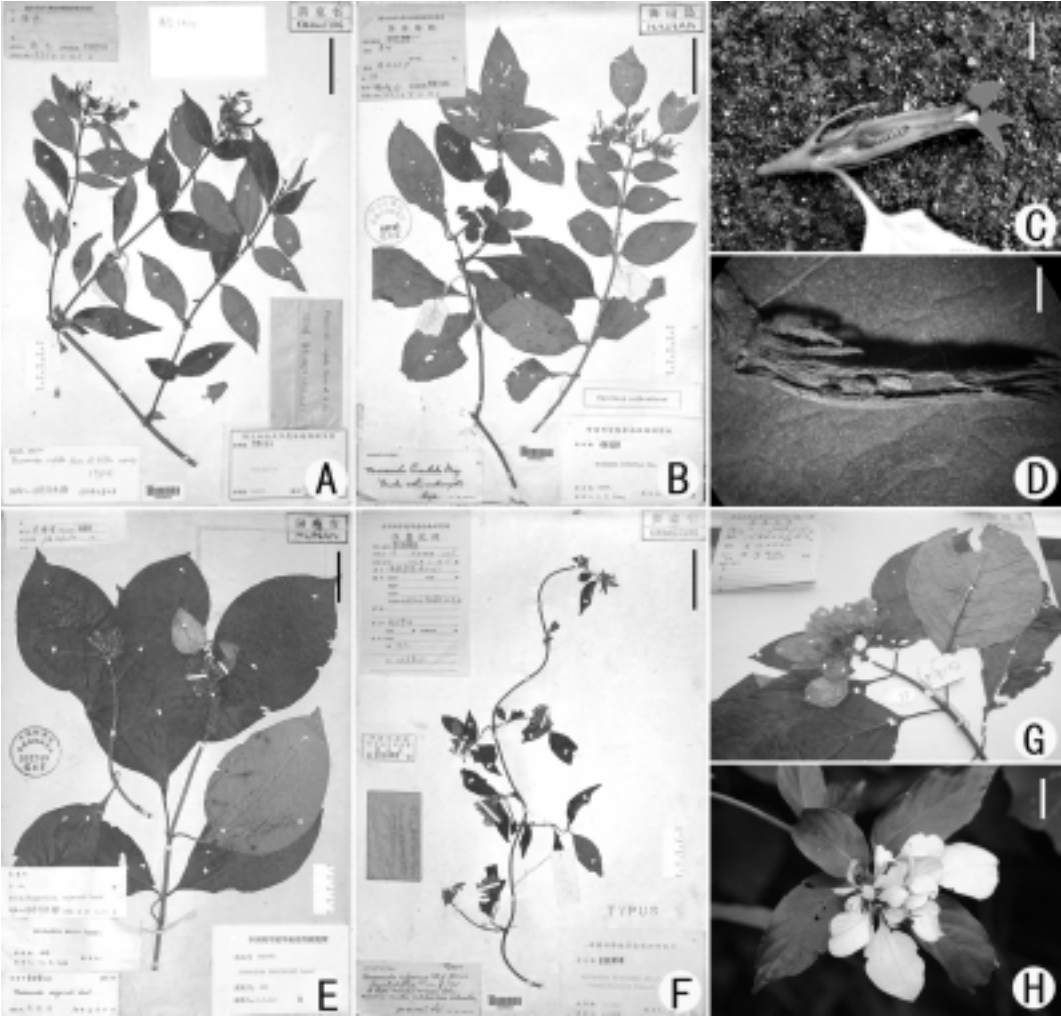


Fig. 1. Photographs of some specimens and two dissected flowers of *Mussaenda*. **A**, The holotype of *M. inflata* Hsue & H. Wu (C. Wang 38650, IBSC). **B**, *M. hirsutula* Miq. (H. Y. Liang 62074, IBSC). **C**, A dissected flower of *M. hirsutula* (X. F. Deng 259, IBSC), showing a larva in the corolla tube. **D**, A dissected flower of the holotype of *M. inflata* (C. Wang 38650, IBSC), showing a larva and the feces left by the larva in the corolla tube. **E**, *M. esquirolii* Lévl. (C. T. Lee 629, IBSC). **F**, The holotype of *M. pubescens* Ait. f. forma *clematidiflora* Chun ex Hsue & H. Wu (S. Wang 161915, IBSC). **G**, The isotype of *M. anomala* Li (C. Wang 39567, IBK). **H**, *M. pubescens*, showing the unequal “petaloid” calyx-lobes. **A, B, E, F**, scale bar=4 cm; **C, D, H**, scale bar=0.5 cm.

found nothing but a larva with its feces in the corolla, and the anthers and the style had also disappeared. This examination revealed that insect-damage really brought about the inflation of the calyx-tubes, corolla-tube, and the calyx-lobes, and the enlargement of petals and the calyx-lobes to the flowers on the type specimen.

Mussaenda inflata falls well within the variation range of *M. hirsutula* except the inflated corolla-tube. According to our investigation mentioned above, however, the formation of the inflated corolla-tube is the result of insect-damage. So *M. inflata* is reduced as a synonym of *M. hirsutula*.

2. *Mussaenda esquirolii* Lévl. in Fl. Kouy-chéou 369. 1915. Type: China. Forêts de

Table 1 Comparison between *Mussaenda inflata* and *M. hirsutula*

Character	<i>M. inflata</i>	<i>M. hirsutula</i>
Twig pubescence	+, brown	+, brown or grey
Leaf shape	elliptic or ovate-lanceolate	elliptic or oblong, subovate
Leaf size (mm)	65–78×25–32	55–100×25–40
Stipule (mm)	2-partite, lanceolate, 5	2-partite, lanceolate, 4–6
Calyx-tube (mm)	turbinate, 3–4.5	elliptic, 4
Calyx-lobe (mm)	lanceolate, 9–11×0.1	lanceolate, 7–10×0.05
Petaloid calyx-lobe (mm)	broadly elliptic, 40×20	broadly elliptic, 40–45×30–35
Corolla-tube (mm)	inflated from throat to base, 19 mm long	inflated from middle of the tube upward, 20 mm long
Corolla-lobe (mm)	ovate-elliptic, 7–8×3	elliptic, 6×3

+, present; –, absent.

Tong-Tchéou (贵州桐梓关?), 1912-06-22, *Jos. Esquirol* 3264 (holotype, E; isotype, A).
M. anomala Li in Journ. Arn. Arb. 24: 454. 1943, syn. nov. Type: China. Guangxi (广西): Jinxiu (Tseung-yuen) (金秀), Yao Shan (瑶山), 1936-06-27, *C. Wang* (黄志) 39567 (holotype, IBSC!; isotype, IBK!).

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M. anomala (Fig. 1: G) resembles *M. esquirolii* (Fig. 1: E) in having large, broad, thin leaves. The most remarkable difference between these two species is that all the calyx-lobes in *M. anomala* are enlarged to become “petaloid”, while the calyx-lobes in *M. esquirolii* are foliar, and lanceolate in shape, and only one of the calyx-lobes of several flowers is enlarged to become “petaloid” (Table 2).

Table 2 Comparison between *Mussaenda anomala* and *M. esquirolii*

Character	<i>M. anomala</i>	<i>M. esquirolii</i>
Leaf shape	elliptic or elliptic-ovate	broadly elliptic or broadly ovate
Leaf size (mm)	130–170×75–115	100–200×50–100
Leaf texture	thinly chartaceous	thinly chartaceous
Lateral nerve	8–10 opposite	9 opposite
Bracteole (mm)	lanceolate, 9–10×2–3.5	linear lanceolate, 5–10×2–3
Calyx-tube (mm)	oblong, 4–5 mm long	elliptic, 4 mm long
Calyx-lobe (mm)	all enlarge into petaloid	foliar lanceolate, 9–10×2–3
Petaloid calyx-lobe (mm)	ovate-elliptic, 20–40×15–25	elliptic, 30–40×20–25
Corolla-tube (mm)	12 mm long	9–12 mm long
Corolla-lobe (mm)	ovate, 3 mm long	ovate, 2–4 mm long

However, the character that all the calyx-lobes being enlarged into “petaloid” has been noted in *M. erythrophylla* Schum. & Thonn., *M. hybrida* Hort. cv. Alicia and in the Philippine *M. philippica* A. Rich. var. *aurorae* Sulit, and we have also observed all the calyx-lobes were enlarged to become “petaloid” in several inflorescence of *M. pubescens* in South China Botanical Garden, though this phenomenon is not universal in all these species, and varies in different flowering seasons.

Ever since *M. anomala* was published in 1943, no additional specimen of this species has been collected. In spite of extensive visits to the type locality (including visits by the present authors), no specimen referable to *M. anomala* was ever collected. Since the phenomenon of all five calyx-lobes becoming “petaloid” is an unstable character, and it may be an abnormal development induced by environmental factors, we concluded that it is unjustifiable to establish a new taxon based solely on the character of all calyx-lobes becoming “petaloid”. Furthermore, all important characters of *M. anomala*, such as shape and size of leaf and corolla, arrangement of branches and flowers, are perfectly consistent with those in *M. esquirolii*. We thus consider that the two species are deemed to be conspecific and *M.*

anomala is therefore treated as a synonym of *M. esquirolii*.

3. *Mussaenda pubescens* Ait. f. in Hort. Kew. ed. 2, 1: 372. 1810. Type: not designated.
M. pubescens Ait. f. forma *clematidiflora* Chun ex Hsue & H. Wu in Acta Phytotax. Sin. 24: 239. 1986, syn. nov. Type: China. Guangdong (广东): Gaoyao (高要), 1956-05, S. Wang (黄成) 161915 (holotype, IBSC!).

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The type of *M. pubescens* f. *clematidiflora* (S. Huang 161915, IBSC) (Fig. 1: F) is very similar to *M. pubescens*, except that all the calyx-lobes are enlarged to become unequal “petaloid”, 10–18×2–8 mm in size. The calyx-lobes in typical *M. pubescens* are linear-lanceolate, 7–10×0.2–0.5 mm in size and only one of the calyx-lobes of several flowers is enlarged to become “petaloid”, up to 20–50×20–35 mm. There are no other characters that distinguish *M. pubescens* f. *clematidiflora* from *M. pubescens*. The other characters of *M. pubescens* f. *clematidiflora* specified in the protologue are quantitative in nature and clearly fall within the variation range of *M. pubescens*.

Although the phenomenon that all the calyx-lobes are enlarged to become “petaloid” is not universal, we have observed this phenomenon in several inflorescences of *M. pubescens* (Fig. 1: H) in South China Botanical Garden in 2004, while it did not appear in the same plant in 2005. We thus conclude that all the calyx-lobes being enlarged to become “petaloid” is an unstable and unusual character, which could not be used to establish a new taxon. *M. pubescens* f. *clematidiflora* is thus reduced to synonymy of *M. pubescens*.

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国产玉叶金花属(茜草科)的三个新异名

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摘要 澄清了中国产玉叶金花属*Mussaenda* 2种1变型的分类学位置, 分别将胀管玉叶金花*M. inflata* Hsue & H. Wu、异形玉叶金花*M. anomala* Li和灵仙玉叶金花*M. pubescens* Ait. f. forma *clematidiflora* Chun ex Hsue & H. Wu作为粗毛玉叶金花*M. hirsutula* Miq.、大叶白纸扇*M. esquirolii* Lévl.和玉叶金花*M. pubescens* Ait. f.的新异名处理。

关键词 玉叶金花属; 粗毛玉叶金花; 大叶白纸扇; 玉叶金花; 新异名; 茜草科